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ABSTRACT

The nature of children's distress reactions to medical treatment is examined in terms of age and sex differences and initial normative data are provided. Predominately white, middle class children, ages 1 to 11, were observed while receiving allergy treatment injections. Males were observed on 453 injection occasions while females were observed on 259 injection occasions making a total of 712 observations. Unobtrusive observations were made in the waiting room over a 7-week period. Observers marking rating sheets were able to be unobtrusive because (1) there were 10 to 20 adults in the waiting room at any one time and (2) many of these people read or worked while waiting. Data were collected with the Child Medical Distress Scale which scores 12 aspects of children's expression of distress as well as yielding a total scale score. Results indicated that, in general, children between the ages of 4 to 5 years and younger displayed substantially more overt indicators of distress than children of 7 to 11 years of age. The data show that "grimacing," "affected posture," and "overall distress" occurred most often in all children and that "pain statements" and "steps away" occurred least often. On many items there were substantial changes in score across age. Implications for understanding children's responses to medical treatment are discussed and a copy of the rating scale employed as well as figures depicting mean performance on each item of the scale for both sexes across age are included in the report. (Author/RH)

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The Expression of Distress by Children Receiving Medical Treatment

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Abstract

Children ages 1-11 were observed on 713 occasions of allergy immunization injections. Data indicated there were no differences between males and females in the level of distress expressed in response to these injections but that there were substantial age differences. Implications for understanding children's responses to medical treatment are discussed.

The Expression of Distress by Children Receiving Medical Treatment

Children reacting with distress to medical treatment is an event accepted by health care professionals. However, a child's expression of distress can, depending on its intensity, have important deleterious effects on not only the child receiving treatment but the parents of the child, the health care professional providing the treatment and even the manner in which treatment is provided (i.e. haphazardly, carefully, or not at all). The present paper examines the nature of children's medical treatment induced distress in terms of age and sex differences and provides initial normative data.

Nature of Allergy Treatment Injections

The typical child patient receiving allergy immunology treatment was on a schedule of weekly injections and came to the office approximately every seventh day at any time between 9 a.m. and 5 p.m. In this particular office the physicians took care to make the injections less painful by using the smallest needle available (27 guage) and a water based solution for the allergens, in contrast to the less perishable but more stinging glycerine-based solution. The amount of time it took the nurse to deliver the injection varied with the amount of serum that was injected but, in general, the injection itself (needle in to needle out) was performed in 3-5 seconds.

The injections were given by either one or two nurses at any given time depending upon the number of patients waiting. The nurse, after reading the child's name on the sign in sheet, pulled the child's card from a file, prepared the child's allergy serum and then called for the child in the waiting room. The injections were given within one of two

doorways and were in full view of much of the waiting room. After the injection was given the child returned to the waiting room where he or she waited for 20 minutes so that a possible reaction to the injection could be identified and treated. At the peak hours and seasons (in which there were many plant-produced allergens) there were 30 to 50 injections given per hour by each nurse and 50% to 80% of these were given to children.

Subjects

Children from age 1 through age 11 were observed while receiving allergy treatment injections. The children were predominately white, middle class. Males were observed on 453 injection occasions while females were observed on 259 injection occasions making a total of 712 observations. For children age 2 to 11 there were from 49 to 91 observations made while for children age one and younger there were 18 observations made (see Table 1 or 2 for exact numbers at each age and of each sex).

Observational Procedure

The observations were taken in the waiting room which is arranged in such a way so that observers could sit with patients and have a clear view of children receiving injections. The observers were able to be unobtrusive for two reasons: (a) there were 10 to 20 adults in the waiting room at any one time and (b) because patients had to wait 20 minutes after receiving their injections the many people in the waiting room were usually engaged in work and reading that they brought with them and so appeared not unlike the observers marking rating sheets.

The observations were made by the principal investigator and nine

other psychology graduate students or faculty. They were done over a seven week period (from April 29 to June 13, 1980). Data was provided by the Child Medical Distress Scale (Ballard & Gipson, Note 1) which scores 12 aspects of children's expression of distress as well as yielding a total scale score (see Figure 1). Observer instructions for using the CMDS appear in Table 3.

Results

Sex differences. There was no significant difference between males and females on the total scale score. The item "appears happy" which was scored immediately before the injection found females scoring significantly higher than males indicating they appeared happier before the injection. However, the magnitude of difference was fairly small and should be interpreted carefully. On one item "looks away" males scored significantly higher then females indicating that they tended to watch the shot being given more often but again the actual magnitude of difference was small.

Age differences. The total distress scale score was significantly different for children at different ages with the mean score at ages 1-11 ranging from 45.50 at age 1 to 36.90 at age 6 to 29.83 at age 11 ($F(10,701)= 19.62$, $p < .0001$). As can be seen in Figure 2 which provides norms for all children, by the time a score of 40 is reached the distribution of scores is at the 65th percentile. This was consistent with the overall low total distress scores found in this allergy office; with a range of possible scores from 11-132, 44% of all children scored at 30 or less (low to no distress) and 82 % of all children scored at 50 or less (moderate distress to no distress). A test of multiple comparisons (Tukey's HSD, Kirk, 1968) revealed that ages 2 ($\bar{x}$ = 32.09), 3 ($\bar{x}$ = 57.20), 4 ($\bar{x}$ = 50.11), and 5 ($\bar{x}$ = 43.10) showed a significantly higher overall distress score than ages 7 ($\bar{x}$ = 32.09), 8 ($\bar{x}$ = 30.74), 9 ($\bar{x}$ =

32.27), 10 ($\bar{x}$ = 30.16) and 11 ($\bar{x}$ = 29.83), and in addition, ages 2,3, and 4 showed a significantly higher distress score than age 6 ($\bar{x}$ = 36.75) (Tukey's HSD). A trend test on the relationship between age and total distress score indicated that there were both linear and non-linear components (linear trend, $F(10,701) = 160.63$, $p < .0001$, departure from linear trend $F\ (9,701) = 3.95$, $p < .0001$).

Children at different ages varied significantly on all individual scale items (includes grimacing, pain statements, affected posture, steps away, cries, crying intensity, pulls away from parent, pulls away from nurse, requires restraint, and overall distress) except "looks away". Mean scores on individual items according to the child's age and sex are presented in Figures 3 through 13.

The item "cries" which appears in Figure 9 nicely illustrates the magnitude of the difference in scores and the linear variation with age. The difference among ages for this item was substantial (F (10, 701) = 19.17, $p < .0001$). Ages 2, 3, 4, and 5 cried significantly more than ages 7, 8, 9, 10, and 11; in addition, ages 2, 3, and 4 cried significantly more than ages 6 and 7, and age 3 cried significnatly more than age 1, 2, and 5. (Tukey's HSD). A trend test on the relationship between age and crying indicated that there were both linear and non-linear components (linear trend, $F\ (1,701) = 135.34$, $p < .0001$, departure from linear trend, $F\ (9,701) = 6.126$, $p < .0001$.

Discussion

In general, children between the ages of 4-5 and younger displayed substantially more overt indicators of distress than children ages 7-11. The data show that "grimacing," "affected posture," and "overall distress" occurred most often in all children and that "pain statements" and "steps away" occurred least often. "Grimacing" and "affected

posture" were probably observed most often because they are accepted as appropriate distress behaviors during painful treatment even for adults. As children begin to verbalize their distress or try to avoid the painful treatment they are behaving in a less acceptable manner and experience more negative consequences for their behavior, hence the lower occurrence of such behaviors such as crying and resisting.

On many items there were substantial changes in score across age. For example, on the item "cries," children at age 3 scored four times greater than children at ages 8-11. Similar magnitudes of difference between the highest and lowest scoring age were found for "crying intensity," "pulling away from parent," "pulling away from nurse" and "requiring restraint."

On some items an increasing then decreasing curve for mean scores was observed. The possible explanations for these curves vary with the item. On "pain statements" which starts at a zero level at age 1, increases to their highest at age 3 and then decreases slowly from age 4 to age 11 the explanation for the increase is most likely due to the absence of language skills adequate to voicing complaints until about age 3. The decrease in the score after age 3 may be due to the child's increasing sensitivity to social pressure to not verbalize distress in the presence of peers. For the item "cries," which was scored according to the duration of the crying, crying duration increased up to age 3 and rapidly decreased after age 4. Crying may have a shorter duration in 1 and 2 year olds because they may be less able to cognitively anticipate the pain that will occur and therefore do not cry before or long after the injection. At age 3 the child is able to deal with the situation cognitively, anticipate the pain and therefore cry longer. The

decrease in crying after this age is probably due to increasing socialization.

On all items except "looks away, " "affected posture" and "steps away," males scored slightly higher than females; however, only on " "looks away" was the difference statistically significant with males watching the shot being given more often than females. On one item, "appears happy," females had a statistically significant higher score however, as in "looks away" the magnitude of difference was quite small.

Keeping in mind the samll magnitude of difference on these items, no substantial sex differences were found during the medical treatment. This finding is consistent with Katz et al. (1980) who found sex differences in expression of distress before and after a painful bone marrow aspiration but not during the aspiration procedure. It appears that with children at least,a painful medical treatment stimulus has a tendency to override differential socialization factors with males and females.

Practical use of distress norms. Useful information to health care professionals may be obtained by comparing a child's score on the Child Medical Distress Scale with the norms presented in Table 4. With this information, one can determine, at least within the constraint of the population observed, how "normal" a child's reactions are to painful treatment and determine whether the child needs some help in coping or should be tolerated at this point. One could also use this information to help make predictions based upon age and sex on how the child might be expected to behave during painful treatment and then focus on prevention of the extreme distress behaviors using any one of a number of techniques demonstrated effective in reducing anxiety associated with treatment (e.g. sensory information, Johnson, 1973)

It should be noted that this normative data refers to a group of mostly white, middle-class children who are patients of private allergy

specialists and that the overall low level of distress found in this allergy office might restrict extending the generalization of these norms to other populations.

Reference Note

1. Ballard, B. D., & Gipson, M. The assessment of the behavior of children receiving hypodermic injections. Paper presented at the meeting of the Western Psychological Association, Los Angeles, April, 1981. (Available from Brenda Ballard, Department of Psychology, University of Montana, Missoula, Montana 59812).

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Johnson, J. E. Effects of accurate expectations about sensation on the sensory and distress components of pain. Journal of Personality and Social Psychology, 1973, 27, 261-275.

Katz, E. R., Kellerman, J., & Siegel, S. E. Behavioral distress in children with cancer undergoing medical procedures: Developmental considerations. Journal of Consulting and Clinical Psychology, 1980, 48, 356-365.

Table 1

Mean Distress Scores at Each Age

Experiment 2

Age	Mean	Standard Deviation	N of Subjects
One	45.50	16.05	18
Two	50.54	21.39	69
Three	57.20	26.30	49
Four	50.11	28.14	61
Five	43.46	24.52	68
Six	36.75	16.21	51
Seven	32.10	15.44	63
Eight	30.74	10.66	96
Nine	32.27	10.12	82
Ten	30.16	8.23	91
Eleven	29.83	9.70	63
For entire population	38.31	19.72	711

Table 2

Mean Distress Scores as a Function of Age and Sex

Experiment 2

Age of child	Sex of Child	
	Male	Female
One	45 (n = 17)	46 (n = 1)
Two	50 (n = 49)	52 (n = 20)
Three	57 (n = 33)	57 (n = 16)
Four	55 (n = 39	42 (n = 22)
Five	42 (n = 40)	44 (n = 28)
Six	36 (n = 31)	39 (n = 19)
Seven	30 (n = 36)	35 (n = 27)
Eight	33 (n = 48)	29 (n = 48)
Nine	32 (n = 59)	32 (n = 23)
Ten	31 (n = 60)	29 (n = 31)
Eleven	28 (n = 40)	34 (n = 23)
For entire population	39 (n = 452)	37 (n = 258)

Child's Sex _____ Observer _____

Child's Age _____ Date _____ Time _____

Instructions: Please fill out the top of the form and then for each item circle the number which most accurately reflects the behavior you observe.

1. Does the child appear happy before the procedure ?

1 2 3 4 5 6 7 8 9 10 11

very happy — neutral — sad

2. Does child look away when procedure is carried out ?

1 2 3 4 5 6 7 8 9 10 11

watches procedure — looks straight ahead — looks away entire time

3. Grimace when procedure is carried out ?

1 2 3 4 5 6 7 8 9 10 11

not at all — just when needle in — entire time

4. Pain statements or complain ?

1 2 3 4 5 6 7 8 9 10 11

no complaint — moderate amount — entire time

5. Affected posture when procedure is done ?

1 2 3 4 5 6 7 8 9 10 11

not at all — chin on shoulder — leaning to side — on floor

6. Does the child step away ?

1 2 3 4 5 6 7 8 9 10 11

no — short distance (less than 1 ft) — moderate distance (less than 2 ft) — out of door

7. Child cries ?

1 2 3 4 5 6 7 8 9 10 11

never — one period — 1½ periods — two periods — 2½ periods — before, during & after

8. How intense is the crying ?

1 2 3 4 5 6 7 8 9 10 11

nothing — tears — whimper — soft cry — loud cry — scream

9. Pulls away from parent while in procedure area ?

1 2 3 4 5 6 7 8 9 10 11

perfectly still or parent not holding — still in (shot) area — runs outside

10. Child pulls away from nurse ?

1 2 3 4 5 6 7 8 9 10 11

perfectly still — flinch — must grab arm — get out of chair to retrieve

11. Child requires restraint ?

1 2 3 4 5 6 7 8 9 10 11

no holding at all — held by nurse or parent — held by nurse & parent — held by more than one nurse

12. How much overall distress does the child show ?

1 2 3 4 5 6 7 8 9 10 11

none — moderate — extreme

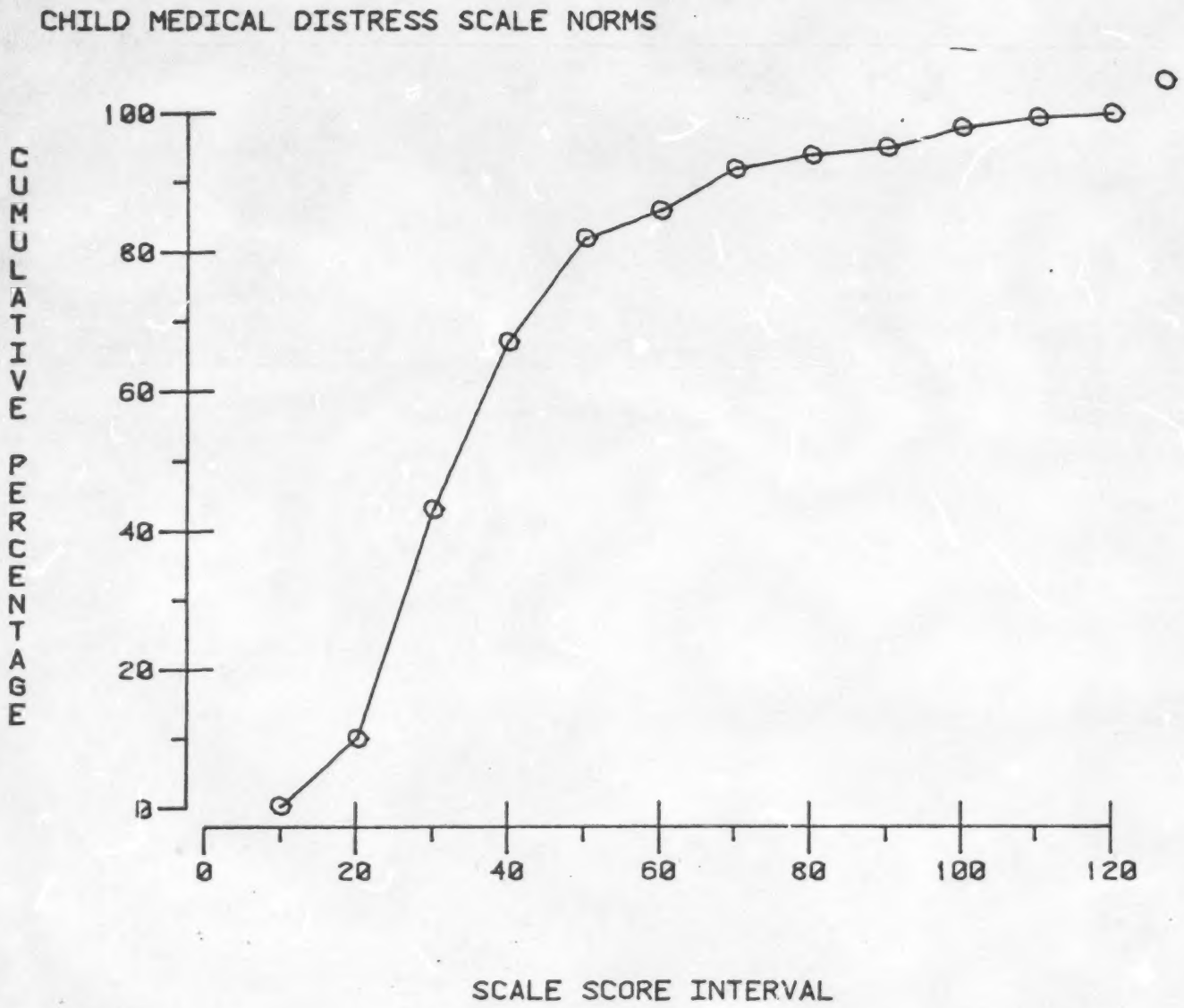

CHILD MEDICAL DISTRESS SCALE NORMS
CUMULATIVE PERCENTAGE
100
80
60
40
20
0
0
20
40
60
80
100
120
SCALE SCORE INTERVAL

Figure 2

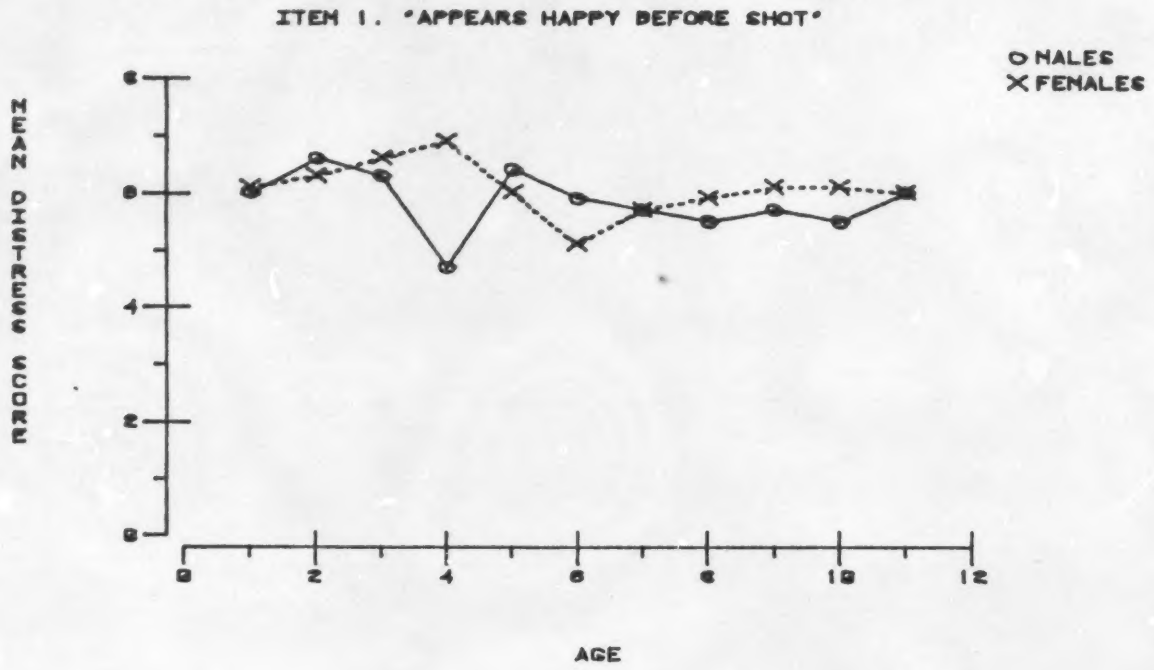
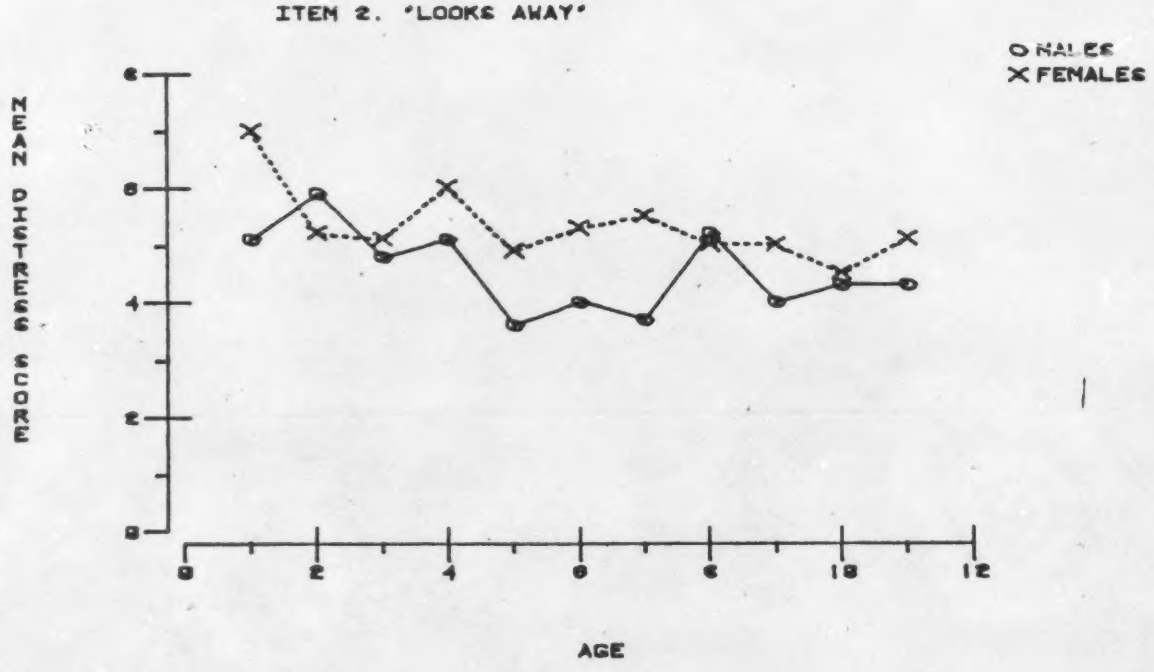


Figure 3



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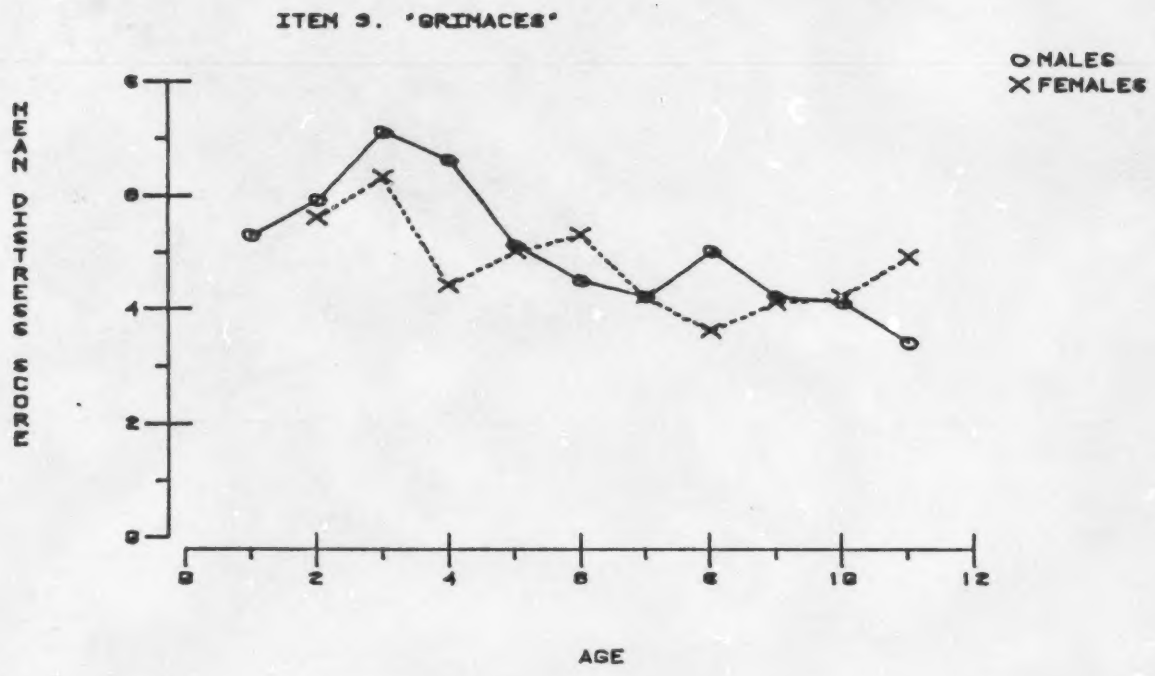

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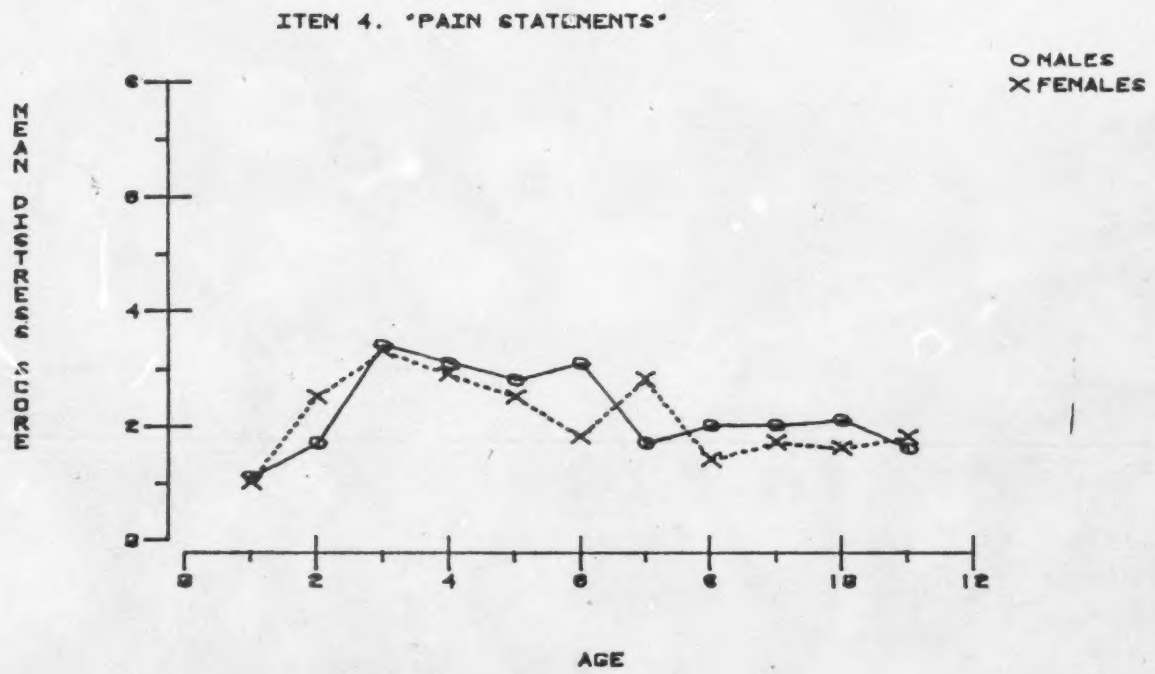

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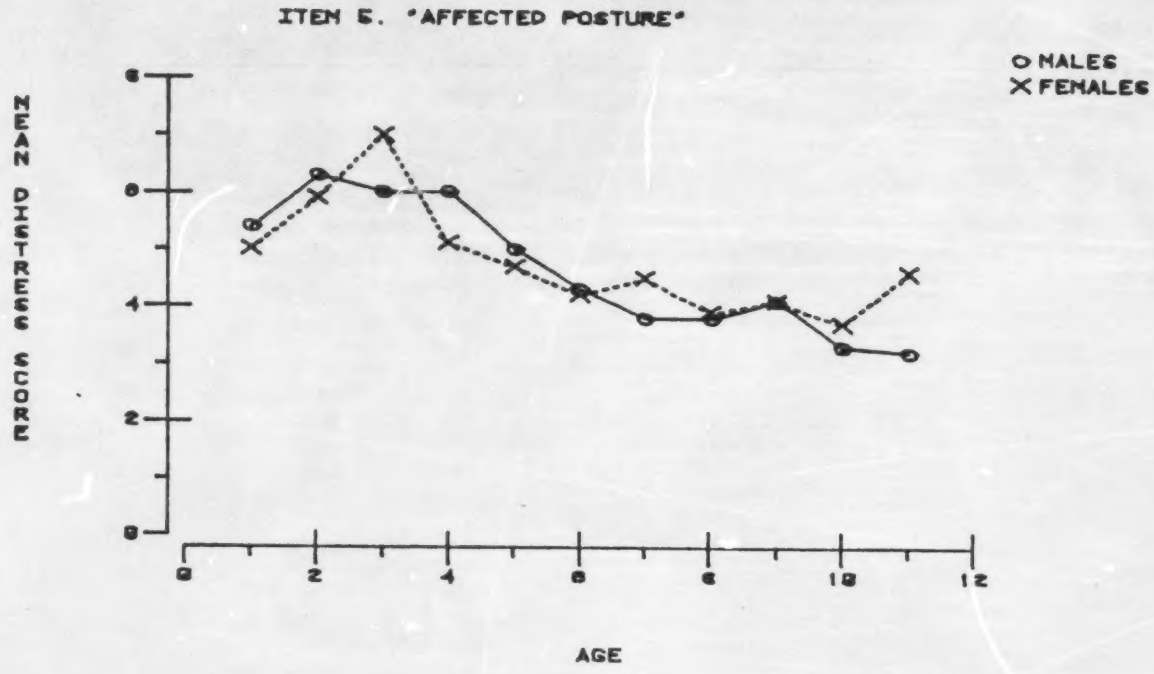

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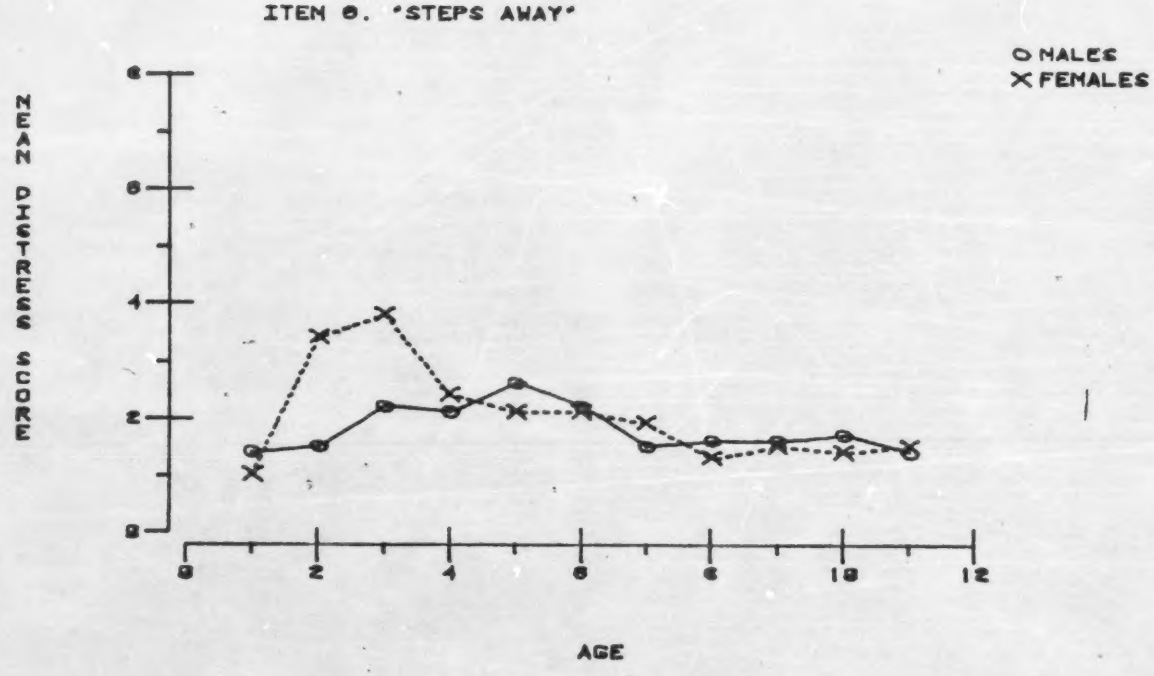
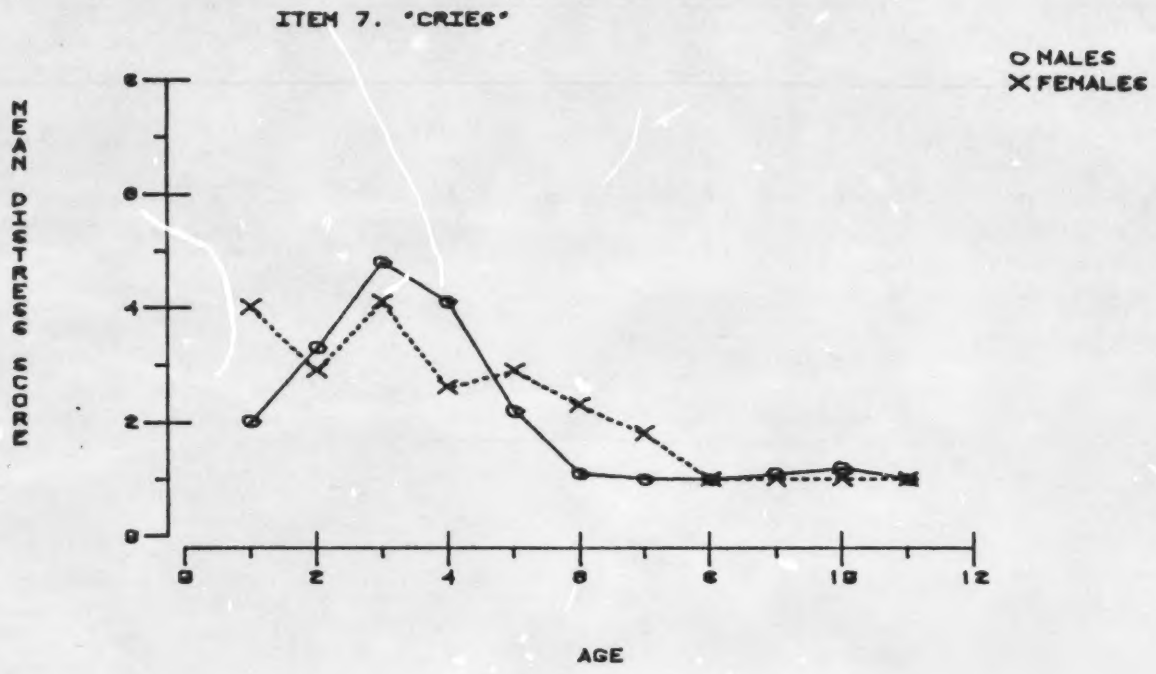


Figure 8



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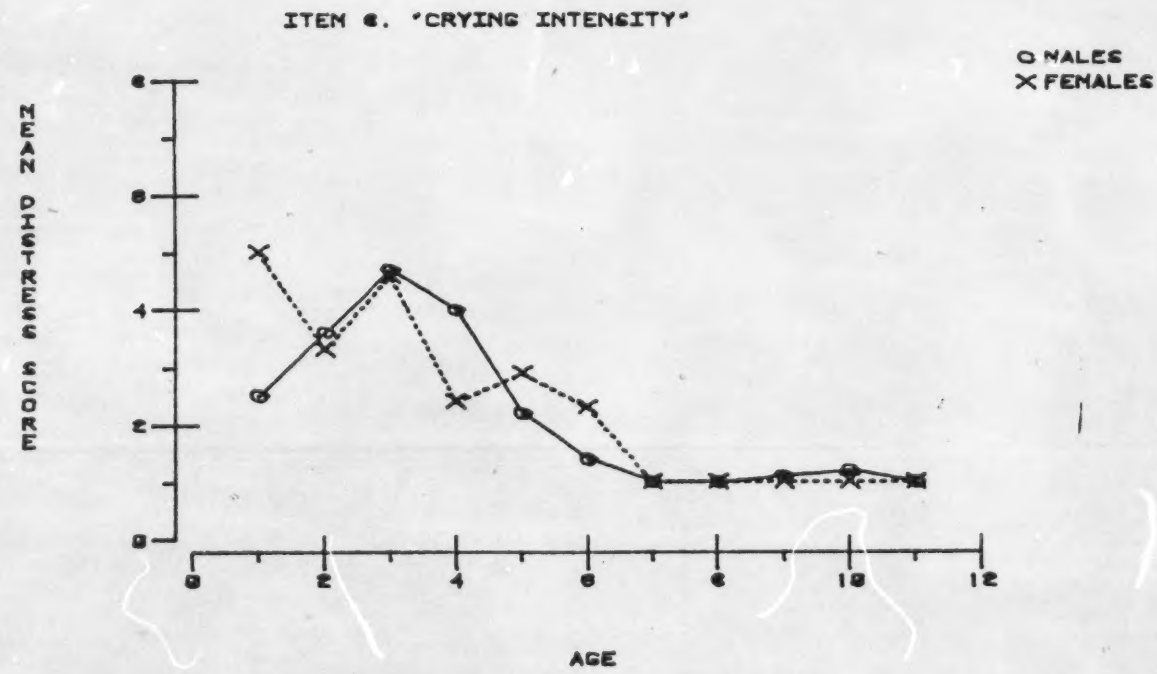

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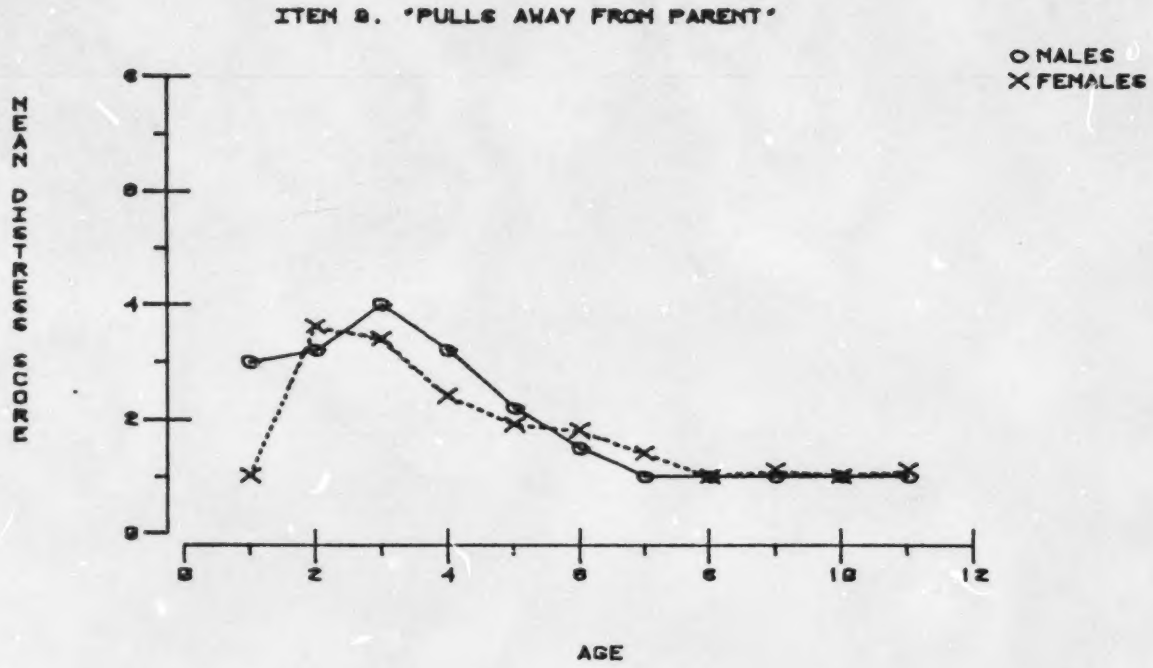

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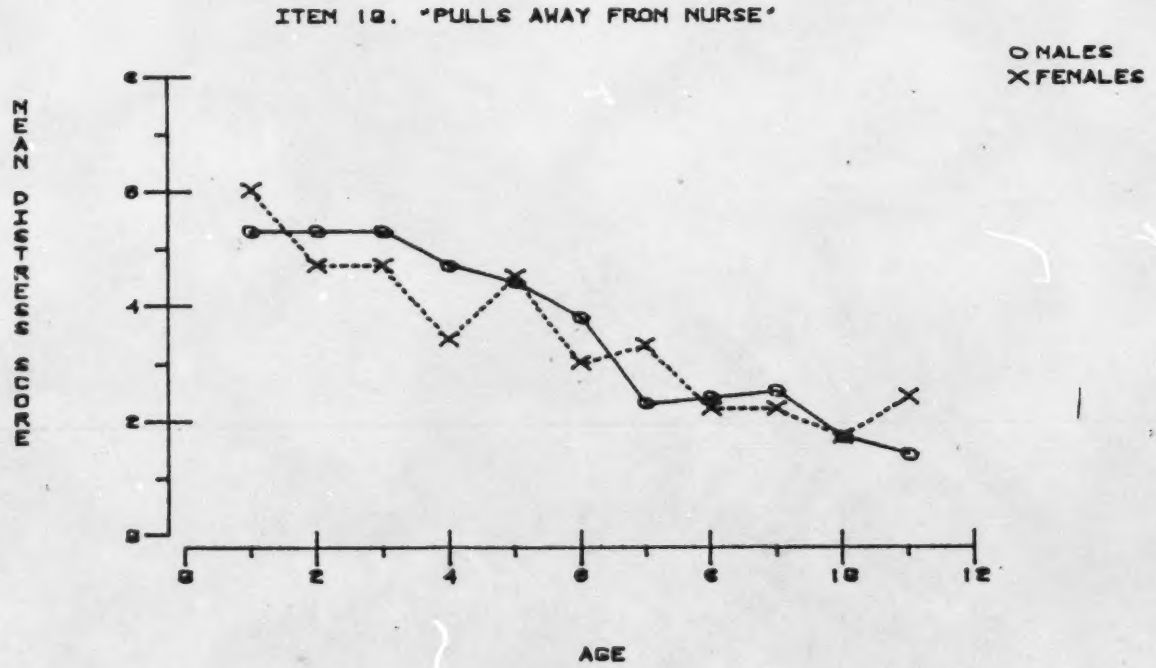

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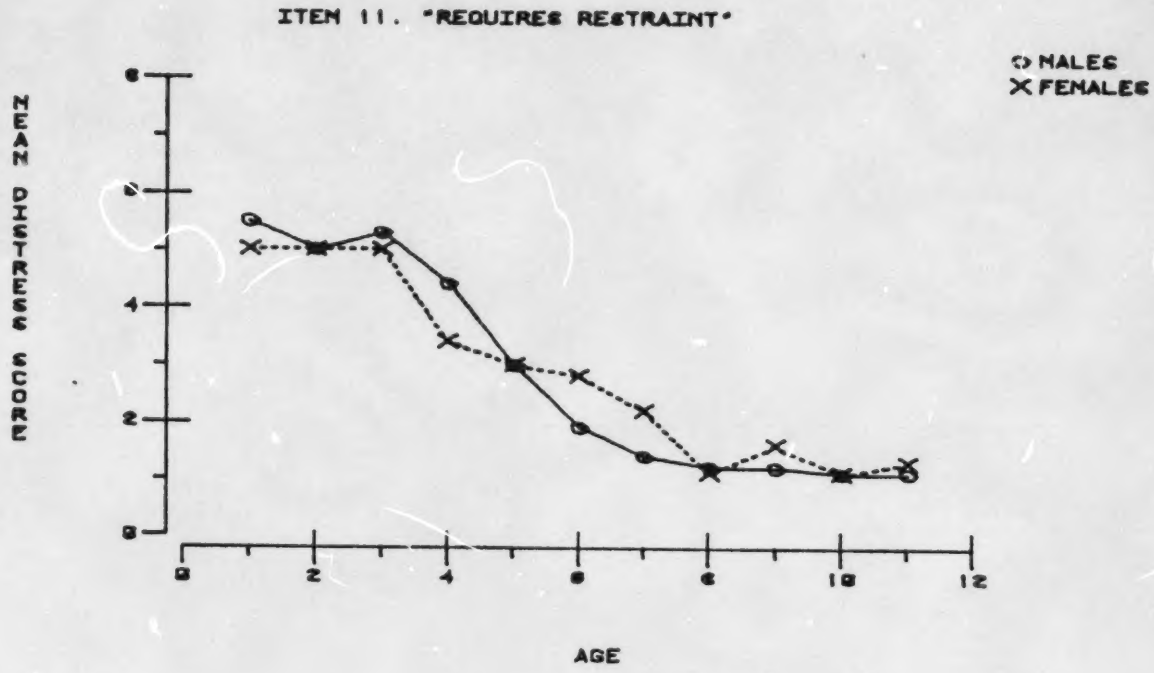

Figure 13

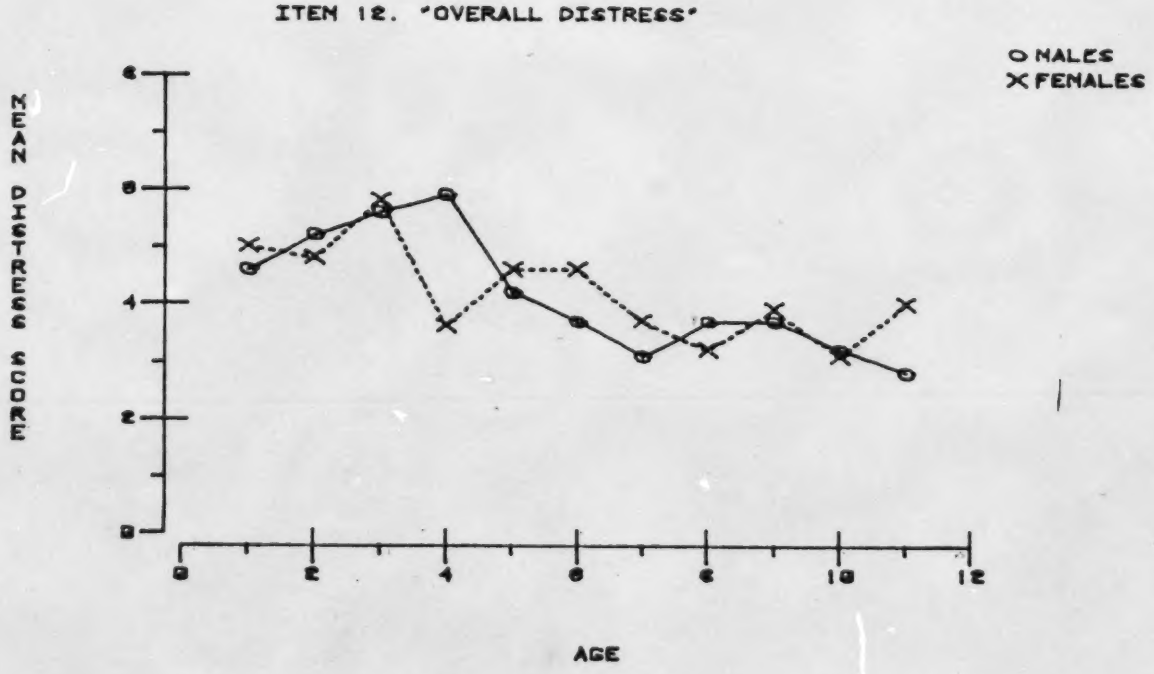

Figure 14